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RELATIONS BETWEEN CORNEAL DISEASES

AND

REFRACTIVE LESIONS OF THE EYE.

BY

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ON THE RELATIONS BETWEEN CORNEAL DISEASES AND REFRACTIVE LESIONS OF THE EYE.

OF the various structures of the human body, few have been subjected to such thorough, critical, and we may add profitable, examinations in respect to the histology and pathology of their tissues, as has the cornea. The names of many of the most learned and illustrious investigators are inseparably connected with this small structure, and the extent and value of their researches indicate its importance. Yet it must be conceded that of the advantages derived from the histological and pathological studies of this part, comparatively few have reverted to the structure itself, and candid observers must agree that in the etiology of corneal diseases the advance has not been in proportion to the added knowledge of its structure and pathology.

A review of the history of the etiology of corneal diseases would show that, since writers of half a century ago, after allowing for the agency of mechanical and chemical injuries and the pressure incident to certain forms of conjunctival disease, united in ascribing the cause of corneitis to scrofula and arthritis, few important advances have been made in determining the causation of these diseases. To the genius of Mr. Hutchinson we owe the discovery that in a clearly defined class of cases of corneal disease, the cause may be found in the diathesis peculiar to inherited syphilis, and that if we would best meet the indications for treatment in these cases we must directly attack the inherited taint. But the proportion of such cases is not large, and there remain after excluding those which arise from mechanical pressure, injuries, chemical irritations, and a few other exceptional causes, the very large residuum of cases which by nearly all authors are regarded as manifestations of struma.

Of phlyctenulæ of the cornea, the form of corneal disease which the surgeon most frequently encounters, a learned French writer of recent times¹ says that the pustules are the first and the most frequent manifestation of scrofula; they are, he says, benign scrofulous exudations. Although this view is not fully accepted by some modern writers, it meets with but the mildest opposition, and the doctrine that the prevailing cause of corneal diseases and especially of phlyctenulæ is struma, is, I believe, the one generally accepted. The truth is that the condition called struma is far more frequently developed by corneal diseases than are corneal troubles developed by struma. One of the most positive evidences of the existence of struma, is supposed to be found in the presence of enlarged cervical glands, but the enlargement of these glands does not usually precede the corneal disease, but is its result.

The fact, well known to ophthalmic surgeons, that patients who have been cured of corneal diseases are quite liable to return after a few months,

¹ Bazin, *Leçons sur la Scrofule*.

or even weeks, with renewed attacks of the disease, showing conclusively an inherent tendency to such troubles, led me a year ago to seek for the cause of the tendency. The excessive nervous irritability, photophobia, and muscular spasm, and the general failure of nutrition in these cases, induced me to regard corneal diseases, especially of the phlyctenular form, as a manifestation of functional nervous derangement. The fact of the easy cure and the frequent recurrence of the diseases strengthened this opinion, and as I had at that time been led to the belief that many functional nervous diseases owed their origin to anomalous refraction of the eyes, I turned to the eyes themselves to seek for the cause of irritation. A few careful examinations satisfied me that a more extended search should be made in this direction, but the difficulties encountered in ascertaining the refractive condition of the eyes of patients suffering from corneitis, especially from phlyctenular corneitis, are great; the intolerance of light, the youth of the patients (for phlyctenular corneal troubles are most frequently found in children from two to eight years of age), and their general irritability, all contribute to render such examinations tedious to both patient and surgeon. To these difficulties I attribute the fact that the well-known maxim among ophthalmic surgeons, to test the refraction of all diseased eyes, has been so far disregarded; for the practitioner whose time is fully occupied by the usual duties of his profession, will find the attempt to examine a large number of these patients in this respect a severe tax upon his time and strength.

I cannot better illustrate the result of my search in this direction than by relating the history of the following case. The first part of the history well illustrates the oft-repeated experience of every ophthalmic surgeon, while the second part will illustrate my own experience in several cases since my attention has been specially directed to this subject.

L. R., a bright boy seven years of age, was, about two years ago, brought to me, suffering from phlyctenular ulcers of both eyes. He had, previous to the eye trouble, enjoyed excellent health, had passed through the usual experience of childhood in respect to infantile diseases with safety and ease, and was regarded as a perfectly healthy and robust child. There was no history of syphilis or of scrofula in the family of either father or mother, both of whom were perfectly healthy people. Treatment for a few days by means of atropine and stimulants applied to the mucous surface of the eyelids, sufficed to effect a speedy cure of the ulcers, and the boy remained well for about three months, when he passed through a similar experience which was repeated a third and a fourth time within a little more than a year. At the close of the second attack, I observed that the cervical glands were swollen as they had not been previously, and with each attack there was more general irritability and more evidence of defective nutrition. During an attack about a year since, his mother called my attention to a defect in her own eyes, which, on examination, I found to consist in hypermetropic astigmatism of $\frac{1}{30}$, and which induced me to test the refraction of the boy's eyes. I found hypermetropia $\frac{1}{30}$, without astigmatism, and advised that he be required to wear + 42 glasses when engaged in studies or in playing with toys. My advice was accepted, and the boy's eyes have since remained well, and with the correction of the refractive evil the so-called strumous symptoms disappeared.

The following case, which has been reported in another connection, will illustrate the relations existing between this and another form of manifestation of nervous trouble.

Mr. F. A. R., of Minnesota, consulted me in September last in regard to his little daughter's eyes. She was a bright girl of ten years, with a defect in her

speech, and was evidently suffering from chorea. On account of her nervous condition she had been kept out of school for more than a year. The trouble for which I was consulted was the presence of a number of small ulcers at the border of the cornea. On testing the refraction, I found astigmatism requiring for its correction a $+36$ cylinder. Glasses were procured, and after brief treatment for the ulcers, resulting in their cure, the father returned with his child to his western home. In the latter part of March, of this year, he again presented the child for treatment, she being again subject to corneal ulcers. I learned that from the time of leaving Albany the child's health had greatly improved, and her nervous symptoms had disappeared. A month or two previous to the last visit, however, her glasses were broken, and she was without them for some time. The nervous symptoms began to return, and the corneæ were again affected with ulcers.

In looking over the records of one hundred and fifty cases of corneal disease in which the refraction has been examined with as much accuracy as the difficulties necessarily encountered would permit, I find that in 80 per cent. there have been serious refractive lesions. Even in two cases which were typical of the physical conformation so clearly described by Mr. Hutchinson as characterizing the offspring of syphilitic parents, a high degree of hypermetropia was found after the infiltrated corneæ had become sufficiently transparent to allow of a determination of the refractive condition, and it is interesting to remember that the flattened facial features described by Mr. Hutchinson are those recognized by ophthalmologists, and so well described by Prof. Donders, as indicative of hypermetropia. In these cases, as in all others in which the refraction has been determined, after the cornea has been affected, allowance must of course be made for changes in the form of the cornea which may have resulted from disease, but as in each of the cases alluded to a high degree of hypermetropia was found ($\frac{1}{18}$ and $\frac{1}{14}$) the defect could hardly be ascribed to this cause.

In my efforts to determine the refraction in these cases, I have often been obliged to be satisfied with an examination of the unaffected eye by means of test letters, or by the ophthalmoscope alone. In several instances the examinations have been made after recovery from the disease. Among the refractive errors, hypermetropia seems to rank first as a cause of corneal affections; second, astigmatism; and third, unequal degrees of myopia. A larger number of cases than I have examined would be necessary to determine the relative frequency of these conditions. Simple myopia of equal degrees in the two eyes, I have not found except in young children in whose cases the refraction has been determined by the ophthalmoscope. In these cases, I suspect an astigmatism not recognized by this means of examination.

It is important to notice two conditions which are often associated with corneal diseases: First, the herpetic eruption which is so common in phlyctenular corneitis; and second, an inflamed condition of the free border of the eyelid. The herpetic eruption which appears about the lips, cheeks, and nose, in cases of phlyctenular corneal troubles, is conceded to be the result of irritation of branches of the fifth nerve. That it is due to the reflex irritation from the ciliary nerves, I think it reasonable to suppose, for I have often seen these herpetic eruptions about the cheeks, nose, and lips, disappear quickly after correcting the refraction of the eye, and with no further treatment. The blepharitis would also in most instances seem to be one of the manifestations of reflex irritation from the same cause, as I have long observed; and the

swelling of the lids, which is of itself sometimes the immediate cause of corneal lesions, is, I believe, one of the various results of the peripheric irritation beginning in the ciliary body.

That a reflex nervous irritation, like that arising from the strain upon the ciliary muscle in erroneous refraction, can interfere in the nutrition of the cornea, there can be no doubt; and, if we watch the course of a corneal phlyctenula, we shall see that nutrition is disturbed first by irritation of the vaso-motor nerves of the conjunctiva; for here we observe, before the appearance of any efflorescence of the cornea can be discovered, the fasciculus of red vessels, and indeed, if promptly met by appropriate treatment, this can usually be made to disappear before the herpetic pustule is developed at all.

May it not be a mistake to regard the herpetic pustule as the centre of irritation around which the vascular injection of the conjunctiva forms an objective expression? Were this the case, would not the pustule appear first, whereas, frequently, it is entirely aborted? Is it not more probable that the condition of the vessels in this congested fasciculus, is such as to clog the passages through which nutritive material should pass to supply certain portions of the cornea, and that the portion in which nutrition is most defective, suffers first from this interference?



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